Math 1010

Summary Exercises on Rational Expressions & Equations

Name _____ Score _____

A common student error is to confuse an equation, such as $\frac{x}{2}+\frac{x}{3}=-5$, with an expression involving an operation, such as $\frac{x}{2}+\frac{x}{3}$. ***Equations are solved for a numerical answer, while problems involving operations result in simplified expressions.***

Solving an Equation

Solve:

$$\frac{x}{2}+\frac{x}{3}=-5$$

Multiply each side by the LCD, 6. *(or wipe out)*

$$6\left(\frac{x}{2}+\frac{x}{3}\right)=6(-5)$$

$$6\left(\frac{x}{2}\right)+6\left(\frac{x}{3}\right)=6(-5)$$

$$3x+2x=-30$$

$$5x=-30$$

$$x=-6$$

Check that the solution set is { –6 }.

Simplifying an Expression Involving an Operation

Add:

$$\frac{x}{2}+\frac{x}{3}$$

Write both fractions with the LCD, 6.

$$=\frac{x\cdot 3}{2\cdot 3}+\frac{x\cdot 2}{3\cdot 2}$$

$$=\frac{3x}{6}+\frac{2x}{6}$$

$$=\frac{3x+2x}{6}$$

$$=\frac{\mathbf{5x}}{\mathbf{6}}$$

Identify each exercise as an <u>equation</u> or an <u>expression</u>. Then simplify the expression by performing the indicated operation, or solve the equation as appropriate.

1. $\frac{4}{p}+\frac{6}{p}$

2. $\frac{x^3y^2}{x^2y^4}\cdot\frac{y^5}{x^4}$

3. $\frac{1}{x^2+x-2}\div\frac{4x^2}{2x-2}$

4. $\frac{8}{m-5}=2$

5. $\dfrac{2y^2+y-6}{2y^2-9y+9}\cdot\dfrac{y^2-2y-3}{y^2-1}$

6. $\dfrac{x^{-1}+y^{-1}}{x^{-1}-y^{-1}}$

7. $\dfrac{x-4}{5}=\dfrac{x+3}{6}$

8. $\dfrac{3t^2-t}{6t^2+15t}\div\dfrac{6t^2+t-1}{2t^2-5t-25}$

9. $\dfrac{4}{p+2}+\dfrac{1}{3p+6}$

10. $\dfrac{1}{x}+\dfrac{1}{x-3}=-\dfrac{5}{4}$

11. $\dfrac{x^3-8}{x^4-16}\div\dfrac{x^2+2x+4}{5x^2+13x+6}$

12. $\dfrac{2}{x+1}+\dfrac{5}{x-1}=\dfrac{10}{x^2-1}$

13. $\frac{3}{t-1}+\frac{1}{t}=\frac{7}{2}$

14. $\frac{6}{y}-\frac{2}{3y}$

15. $\frac{5}{4z}-\frac{2}{3z}$

16. $\frac{k+2}{3}=\frac{2k-1}{5}$

17. $\frac{2}{k^2-4k}+\frac{3}{k^2-16}$

18. $\frac{2k^2-3k}{20k^2-5k}\div\frac{2k^2-5k+3}{4k^2+11k-3}$

19. $\frac{y+4}{y^2-3y+2}-\frac{5}{y^2-4y+3}=\frac{y-4}{y^2-5y+6}$

20. $\frac{\frac{5}{x}-\frac{3}{y}}{\frac{9x^2-25y^2}{x^2y}}$

21. $\dfrac{4x^2-x}{6x^2+10x} \div \dfrac{8x^2+2x-1}{3x^2+11x+10}$

22. $\dfrac{x}{x-2}+\dfrac{3}{x+2}=\dfrac{8}{x^2-4}$

23. $\dfrac{1}{m^2+5m+6}+\dfrac{2}{m^2+4m+3}$

24. $\dfrac{3}{x+3}+\dfrac{4}{x+6}=\dfrac{9}{x^2+9x+18}$

25. $\dfrac{\dfrac{6}{x+1}-\dfrac{1}{x}}{\dfrac{2}{x}-\dfrac{4}{x+1}}$